

WHAT IS CLAIMED IS:

1. A light receiving element for blue rays comprising:
  - a substrate;
  - 5 a p<sup>+</sup> barrier layer (PBL) buried in the substrate by a designated depth for serving as an anode for receiving a power provided from the exterior;
  - 10 a p-type epitaxial layer formed on the p<sup>+</sup> barrier layer (PBL) by epitaxial growth, and provided with a depletion layer area for generating pairs of electrons-holes (EHP) corresponding to energy of incident light from the exterior;
  - 15 a p<sup>+</sup> well layer formed on designated areas of the p-type epitaxial layer, formed by masking, by injecting a designated impurity in an ion state into the designated areas, and electrically connected to the p<sup>+</sup> barrier layer (PBL);
  - 20 a polysilicon layer formed by depositing polysilicon on window areas formed by window-etching an oxide layer obtained by oxidizing the p-type epitaxial layer; and
  - an n<sup>+</sup> shallow junction layer diffused into a designated depth of the p-type epitaxial layer by implanting a designated impurity ion into the polysilicon layer and then heating the polysilicon layer for serving as a cathode for transmitting an electrical signal obtained by photoelectric conversion to the exterior.

2. A light receiving element for blue rays comprising:  
a substrate;  
a p<sup>+</sup> barrier layer (PBL) buried in the substrate by a  
designated depth for serving as an anode for receiving a power  
5 provided from the exterior;  
a p-type epitaxial layer formed on the p<sup>+</sup> barrier layer  
(PBL) by epitaxial growth, and provided with a depletion layer  
area for generating pairs of electrons-holes (EHP)  
corresponding to energy of incident light from the exterior;  
10 a p<sup>+</sup> well layer formed on designated areas of the p-type  
epitaxial layer, formed by masking, by injecting a designated  
impurity in an ion state into the designated areas, and  
electrically connected to the p<sup>+</sup> barrier layer (PBL);  
a polysilicon layer formed by depositing polysilicon,  
15 doped with an impurity ion, on window areas formed by window-  
etching an oxide layer obtained by oxidizing the p-type  
epitaxial layer; and  
an n<sup>+</sup> shallow junction layer diffused into a designated  
depth of the p-type epitaxial layer by heating the polysilicon  
20 layer for serving as a cathode for transmitting an electrical  
signal obtained by photoelectric conversion to the exterior.

3. The light receiving element as set forth in claim 1  
or 2, wherein:  
25 the polysilicon layer is overlapped with the oxide layer

by a designated distance; and

parts of the polysilicon layer formed on the window areas and the oxide layer are removed by etching after the formation of the n<sup>+</sup> shallow junction layer.

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4. The light receiving element as set forth in claim 1 or 2,

wherein non-removed portions of the polysilicon layer formed on the window areas and the oxide layer serve as 10 external electrodes for receiving a power provided from the exterior.

5. The light receiving element as set forth in claim 1 or 2,

15 wherein the impurity ion-injected into the p<sup>+</sup> well layer is one selected from the group consisting of boron (B) and BF<sub>2</sub>.

6. The light receiving element as set forth in claim 1 or 2,

20 wherein the n<sup>+</sup> shallow junction layer has a junction depth of 0.1μm to 0.2μm.

7. The light receiving element as set forth in claim 1 or 2,

25 wherein the impurity ion forming the n<sup>+</sup> shallow junction

layer is one selected from the group consisting of phosphorous (P) and arsenic (As).

8. A method for manufacturing a light receiving element  
5 for blue rays comprising the steps of:

(a) forming a p<sup>+</sup> barrier layer (PBL) for serving as an anode for receiving a power provided from the exterior on a substrate;

10 (b) growing a p-type epitaxial layer, provided with a depletion layer area for generating pairs of electrons-holes (EHP) corresponding to energy of incident light from the exterior, on the p<sup>+</sup> barrier layer (PBL);

(c) forming a p<sup>+</sup> well layer, electrically connected to the p<sup>+</sup> barrier layer (PBL), on the p-type epitaxial layer;

15 (d) forming an oxide layer by oxidizing the p-type epitaxial layer;

20 (e) forming a polysilicon layer by depositing polysilicon on overlapped areas between window areas formed by window-etching the oxide layer and the oxide layer by a designated distance;

(f) implanting a designated impurity ion into the polysilicon layer;

25 (g) forming an n<sup>+</sup> shallow junction layer into a designated depth of the p-type epitaxial layer by heating the polysilicon layer provided with the implanted impurity ion;

and

(h) etching the polysilicon layer formed on the overlapped areas between window areas and the oxide layer by the designated distance.

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9. A method for manufacturing a light receiving element for blue rays comprising the steps of:

(a) forming a p<sup>+</sup> barrier layer (PBL) for serving as an anode for receiving a power provided from the exterior on a substrate;

(b) growing a p-type epitaxial layer, provided with a depletion layer area for generating pairs of electrons-holes (EHP) corresponding to energy of incident light from the exterior, on the p<sup>+</sup> barrier layer (PBL);

(c) forming a p<sup>+</sup> well layer, electrically connected to the p<sup>+</sup> barrier layer (PBL), on the p-type epitaxial layer;

(d) forming an oxide layer by oxidizing the p-type epitaxial layer;

(e) forming a polysilicon layer by depositing polysilicon, doped with an impurity ion, on overlapped areas between window areas formed by window-etching the oxide layer and the oxide layer by a designated distance;

(f) forming an n<sup>+</sup> shallow junction layer into a designated depth of the p-type epitaxial layer by heating the polysilicon layer doped with the impurity ion; and

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(g) etching the polysilicon layer formed on the overlapped areas between window areas and the oxide layer by the designated distance

5           10. The method as set forth in claim 8 or 9,  
              wherein the n<sup>+</sup> shallow junction layer has a junction  
              depth of 0.1 $\mu$ m to 0.2 $\mu$ m.